

Appl. No. 10/807,714  
ARL 03-83

Confirmation No. 4402  
Amdt. dated May 2, 2008  
Reply to Office Action of January 2, 2008

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Amendments to the Claims:

MAY 02 2008

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Please Amend the Claims as Follows:

Claims 1-12 (Canceled).

Claim 13 (currently amended): A multilayer structure for use in a device for detection of microwave, millimeter, infrared (IR), ultraviolet, X-ray or gamma radiation comprising: a silicon based substrate; and

an epitaxial Cd<sub>1-z</sub>Zn<sub>z</sub>X<sub>x</sub>X'<sub>1-x</sub> film grown on the silicon based substrate by molecular beam epitaxy from multiple material sources where the flux of each of the multiple material sources is controlled under a given set of epitaxial growth conditions including temperature, where X is a chalcogenide selected from the group consisting of S and Se; X' is a higher atomic number chalcogenide relative to X and X' is selected from the group consisting of S, Se and Te; x is a number greater than zero and less than [[1]] .095; and z is a number greater than or equal to zero .005 and less than [[1]] .015, such that x+z is a value less than .10;

a radiation sensing Hg<sub>1-y</sub>Cd<sub>y</sub>Te layer grown on the Cd<sub>1-z</sub>Zn<sub>z</sub>X<sub>x</sub>X'<sub>1-x</sub> film, the Hg<sub>1-y</sub>Cd<sub>y</sub>Te layer being substantially lattice matched to the Cd<sub>1-z</sub>Zn<sub>z</sub>X<sub>x</sub>X'<sub>1-x</sub> film, where y is a number between .15 and .35 such that the effects of any mismatch are insignificant to device performance and the surface defect density is less than 500 per centimeter squared.

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Claim 14 (currently amended): The multilayer structure of claim 13, wherein X is Se and X' is Te, and wherein the concentration of Zn and Se approaches two percent and x+z approaches .04 and the epitaxial layer is grown by substrate rotation throughout the growth process to produce lateral surface uniformity and low film dislocation density.

Claim 15 (currently amended): The multilayer structure of claim 13 [[14]] wherein the structure is used for the detection of long wavelength IR, x+z is between 0.01 and 0.08 and y is between 0.15 and 0.35 approximately .22.

Claim 16 (cancelled).

Claim 17 (currently amended) The multilayer structure of claim [[16]] 15 wherein X is Se and X' is Te.

Claim 18 (currently amended): The multilayer structure of claim 14 [[16]], wherein x is between 0.01 and 0.08 and y is between 0.15 and 0.30 [.35]], and wherein the radiation sensing layer senses IR radiation.

Claims 19-24 (cancelled).

Claim 25 (currently amended): A Cd<sub>1-z</sub>Zn<sub>z</sub>Se<sub>x</sub>Te<sub>1-x</sub> film grown by molecular beam epitaxy on a silicon based substrate, where x is a number between zero and one inclusive and z is greater than zero and less than one or equal to .02; having an overlayer of Hg<sub>1-</sub>

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$y\text{Cd}_y\text{Te}$  thereon for the detection of infrared (IR) radiation, wherein the  $\text{Cd}_{1-z}\text{Zn}_z\text{Se}_x\text{Te}_{1-x}$  film is substantially lattice matched to the overlayer of  $\text{Hg}_{1-y}\text{Cd}_y\text{Te}$ .

Claim 26 (currently amended): The film of claim 25, wherein  $x+z$  is between [[0.01]]  
0.03 and 0.08 and  $y$  is between 0.15 and 0.35 varies within a range of approximately .2  
for long wavelength IR (LWIR) to a value of .4 for short wavelength IR.

Claims 27-68 (cancelled).

Claim 69 (previously presented): A  $\text{Cd}_{.97}\text{Zn}_{.03}\text{Se}_{.01}\text{Te}_{.99}$  film grown on a single crystal silicon (2 1 1) oriented based substrate, having an overlayer of  $\text{Hg}_{.78}\text{Cd}_{.22}\text{Te}$  thereon, wherein the growth of the  $\text{Cd}_{.97}\text{Zn}_{.03}\text{Se}_{.01}\text{Te}_{.99}$  film is substantially lattice matched to the overlayer of  $\text{Hg}_{.78}\text{Cd}_{.22}\text{Te}$ .

Claim 70 (new ) The  $\text{Cd}_{.97}\text{Zn}_{.03}\text{Se}_{.01}\text{Te}_{.99}$  film grown on a single crystal silicon (2 1 1) oriented based substrate recited in claim 69, where the  $\text{Cd}_{.97}\text{Zn}_{.03}\text{Se}_{.01}\text{Te}_{.99}$  film is grown on the single crystal silicon (2 1 1) oriented based substrate utilizing CdTe (2 1 1)B face.